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NASA-15119 (June 2004)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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Superseding NASA-15119 (October 2003)

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DIVISION 15 - MECHANICAL

SECTION 15119

SELF-CONTAINED CONTROL AND RELIEF VALVES

06/04

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SECTION 15119

SELF-CONTAINED CONTROL AND RELIEF VALVES
06/04

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NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the specification.

This section covers self-contained control and relief valves.

****

PART 1 GENERAL

1.1 REFERENCES

****

NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project specification.

****

The publications listed below form a part of this section to the extent referenced:

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1003	(2001) Water Pressure Reducing Valves

ASME INTERNATIONAL (ASME)

ASME B16.1	(1998) Cast Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250
ASME BPVC SEC IV	(2001) Boiler and Pressure Vessel Code; Section IV, Recommended Rules for the Care and Operation of Heating Boilers

ASTM INTERNATIONAL (ASTM)

ASTM A 126/A 126M	(1995) Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A 463/A 463M	(2002a) Standard Specification for Steel Sheet, Cold-Rolled, Aluminum-Coated, Type

1 and Type 2

ASTM A 48/A 48M	(2003) Standard Specification for Gray Iron Castings
ASTM B 61	(2002) Standard Specification for Steam or Valve Bronze Castings

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 4126-1	(2004) Safety Devices for Protection Against Excessive Pressure - Part 1: Safety Valves
ISO 5209	(1977) General Purpose Industrial Valves - Marking
ISO 5752	(1982) Metal Valves for Use in Flanged Pipe Systems - Face to Face and Center to Center Dimensions
ISO 7005-2	(1988) Metallic Flanges Part 2: Cast Iron Flanges

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-86	(2002) Guidelines for Metric Data in Standards for Valves, Flanges, Fittings and Actuators

1.2 SUBMITTALS

****
NOTE: Review submittal description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.
****

The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES in sufficient detail to show full compliance with the specification:

SD-02 Shop Drawings

The following shall e submitted for self-contained control and relief valves in accordance with paragraph entitled, "General Requirements," of this section.

Fabrication Drawings

The following shall e submitted for self-contained control and relief valves in accordance with paragraph entitled, "Installation," of this section.

Installation Drawings

SD-07 Certificates

Listing of Product Installation shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

Certificates shall be submitted for the following items showing conformance with the referenced standards contained in this section.

Self-Contained Temperature Control Valves
Self-Contained Temperature-Regulator Valves
Rate-of-Flow Controller
Nonmodulating Float Valve
Water Pressure Regulating Valve
Water Pressure Relief Valve
Pilot-Operated Pressure-Relief Valve
Relief Valves for Electric Water Heaters

1.3 GENERAL REQUIREMENTS

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NOTE: If Section 15003 GENERAL MECHANICAL PROVISIONS is not included in the project specification, applicable requirements therefrom should be inserted and the following paragraph deleted.
****

Section 15003 GENERAL MECHANICAL PROVISIONS applies to work specified in this section.

Fabrication Drawings shall be submitted for self-contained control and relief valves, including part numbers and exploded views.

Listing of Product Installation shall be submitted for self-contained control and relief valves, identifying a minimum of five installed units, similar to those proposed for use, that have been in successful service for a minimum period of five years.

PART 2 PRODUCTS

2.1 SELF-CONTAINED TEMPERATURE CONTROL VALVES

****
NOTE: Select or delete the heading and the following paragraphs as applicable to the project.

Type I pressure limits: 25 pounds per square inch (psi) 175 kilopascal, gage, 210 degrees F 99 degrees C water.

Type II pressure limits: 80 psig, 210 degrees F 550 kilopascal, 99 degrees C water.

Select, revise, delete or supplement the following to suit project conditions.

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Self-contained temperature-control valves shall conform to MSS SP-86 and to the following requirements.

****
NOTE: Select one of both of next two paragraphs.
****

Control valves shall be Type I, Class II (integral temperature-sensing units for very hot water).

Control valves shall be Type II, Class 2, Style A (remote temperature-sensing units for very hot water with a single temperature-sensing control element).

Set-point adjustment shall be mounted on the cabinet of the convector; the control knob shall be accessible on the cabinet surface.

Set-point adjustment and thermostat for finned-tube radiation shall be wall-mounted. Thermostat surfaces shall be nickel-plated brass.

Capillary tubing shall be installed and shall be armored. Remote element shall be not less than 18 inches 450 millimeter long and contained within a guard.

Valve disks shall be renewable.

2.2 SELF-CONTAINED TEMPERATURE-REGULATOR VALVES

Valve shall be direct-operated, self-contained type. The valve body shall be [ASTM B 61, (bronze)] [ASTM A 126/A 126M (cast iron)] and rated not less than 125-pounds per square inch (psi) 862 kilopascal saturated working steam-pressure. Body end connections shall be screwed. Trim shall be corrosion-resistant AISI Type 300 Series steel. Replaceable seat and plug shall be hardened or faced with a cobalt-chromium-tungsten alloy to produce a surface with resistance to impact, wire-drawing, and with a Brinell hardness of not less than 450. Packed steam valves shall be fitted with tetrafluoroethylene packing and shall be spring-loaded and self-adjusting. Valve shall be single-seated, suitable for dead-end service, and shall be fail-safe. Remote Class I or Class III filled-bulb element shall be mounted in a nonferrous separable socket. Valve shall maintain set-point temperature, plus or minus 5 degrees F 15 degrees C, with the set point at or near midpoint of the adjustable element range.

2.3 RATE-OF-FLOW CONTROLLER

****
NOTE: Select for service to maintain constant flow-rate, regardless of changing line pressure. Provide flow and size data.
****

Rate-of-flow controller shall be a hydraulically operated, pilot-controlled diaphragm-type globe valve. Pilot control shall be actuated by differential pressure produced across an orifice installed at the inlet. Rate of flow shall be adjusted by varying spring loading on the pilot. Valve body shall be cast iron conforming to ASTM A 48/A 48M, with 125-pound 862 kilopascal ASME B16.1, MSS SP-86 and ISO 7005-2 flanges. Valve trim

shall be manufacturer's standard bronze or AISI 18-8 corrosion-resistant steel. Orifice plate shall be AISI Type 303 corrosion-resistant steel. Diaphragm and seal material shall be Buna-N. Maximum-service-pressure rating shall be not less than 175 psi at 180 degrees F 1207 kilopascal at 82 degrees C.

2.4 NONMODULATING FLOAT VALVE

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NOTE: Use with cooling towers.
****

Nonmodulating float valve shall be pilot-controlled, diaphragm-actuated, spring-loaded, single-seated, hydraulically operated type. Pilot valve shall be mounted on the main valve or remotely mounted within the cooling tower basin. Main valve body shall be cast iron conforming to ASTM A 48/A 48M with screwed ends for sizes smaller than 2-inch DN50 iron pipe size (ips) and flanges conforming to ASME B16.1, MSS SP-86 and ISO 7005-2, for sizes 2-inch DN50 ips and larger. Pilot valve body shall be brass or bronze. Main and pilot valve trim, including linkage and float, shall be the manufacturer's standard bronze-copper or AISI Type 300 series corrosion-resistant steel. Diaphragm materials and seals shall be Buna-N. Maximum-service-pressure rating shall be not less than 175 psi at 180 degrees F 1207 kilopascal at 82 degrees C. Valve operation shall be nonslam.

2.5 WATER PRESSURE-REGULATING VALVE

Pressure-regulating valve shall conform to ASSE 1003 MSS SP-86 and ISO 5752 (ASSE 1003), direct acting.

Pressure-regulating valve shall not stick or allow pressure to build up on the low side. Valve shall be set to maintain a terminal pressure of approximately 5 psi 35 kilopascal in excess of the static head on the system and shall operate within a 2-pound 9 Newtons maximum variation regardless of initial pressure fluctuation, and without objectionable noise under any condition of operation.

2.6 WATER PRESSURE-RELIEF VALVE

Pressure-relief valve shall be constructed, labeled, and installed in accordance with ASME BPVC SEC IV ISO 5209 and ISO 4126-1. Relieving capacity shall be as specified by the referenced publication. Valves shall be of nonferrous construction, complete with test lever.

2.7 PILOT-OPERATED PRESSURE-RELIEF VALVE

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NOTE: Select for pump-discharge pressure control or for surge protection downstream of check.
****

Pilot-operated pressure-relief valve shall be hydraulically operated, pilot-controlled modulating, with adjustable set point over the indicated range. Valve body shall be cast iron conforming to ASTM A 48/A 48M, with 125-psi 862 kilopascal ASME B16.1, MSS SP-86 and ISO 7005-2 flanges. Valve trim shall be manufacturer's standard brass, bronze, or corrosion-resistant steel. Pilot control shall have AISI Type 303 or 304 corrosion-resistant steel trim. Diaphragm and seal material shall be Buna-N. Maximum

service-pressure rating shall be not less than 175 psi at 180 degrees F 1207 kilopascal at 82 degrees C.

2.8 RELIEF VALVES FOR ELECTRIC WATER HEATERS

Temperature- and pressure-relief valves shall conform to ASTM A 463/A 463M. Type I (combination pressure- and temperature-relief) valves shall be installed when the heat input is less than 100,000 Btu 30 kilowatts per hour and when the storage is less than 120 gallons 450 liter. If either or both of the specified conditions will be reached or exceeded, Type II (temperature relief, water rated) or Type III (temperature relief, steam rated) valves shall be installed. Vacuum-relief valves shall be installed on each cold-water branch connection to electric water heaters at an elevation above the top of the heater. Vacuum relief shall be designed to prevent water heater damage from a reverse flow vacuum.

PART 3 EXECUTION

3.1 INSTALLATION

Installation Drawings shall be submitted for self-contained control and relief valves, and valves shall be installed and specified in accordance with the manufacturer's recommendations, and Section 15050 BASIC MECHANICAL MATERIALS AND METHODS.

-- End of Section --